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SHORT COMMUNICATION

The rate of outpatient cataract surgery in ten European countries: An analysis using data from the SHARE survey

S. M. Mojon-Azzi · D. S. Mojon

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Abstract
Background The aim of this study was to determine the rates of outpatient cataract surgery (ROCS) in ten European countries and to find country-specific health indicators explaining the differences.
Methods Using data from the Survey of Health, Ageing and Retirement in Europe (SHARE), 251 eligible respondents were identified for which cataract surgery was the last surgical procedure. The ROCS of ten countries were compared using logistic regression. The influence of the public expenditure on health as per cent of the total expenditure on health, of the number of acute care beds per 1,000 population, and of the number of practicing physicians per 1,000 population, was studied by multiple logistic regression. Additional information was obtained from country-specific opinion leaders in the field of cataract surgery.
Results The ROCS differed significantly between the ten analysed European countries where Denmark had the highest (100%) and Austria the lowest (0%) rate of day care surgery. A decrease in the density of acute care beds ($p<0.0000001$) and in the density of practicing physicians ($p<0.05$) and an increase in the public expenditure on health as per cent of the total health expenditure ($p<0.01$) lead to an increase in the ROCS. According to the opinion leaders, regulations and financial incentives also have a strong influence on the ROCS.
Conclusions The outpatient rate of cataract surgery in the ten European countries was mainly influenced by the acute-care beds density, but also by the density of practicing physicians, and by the public expenditure on health.

Keywords SHARE · Inpatient · Outpatient · Cataract surgery · Europe

Introduction

Cataract surgery is one of the most commonly performed surgical procedures in Europe where complications are extremely rare [1, 2]. While years ago patients were all treated as inpatients and spent several days in hospital, today a large proportion of cataract surgery is performed on a day-care basis. Several authors agree that there are no significant differences in outcome, patient satisfaction or risks of postoperative complications between inpatient and outpatient cataract surgery, but that outpatient surgery is more cost-effective, mainly because there are no costs of overnight stays and lower out-of-pocket expenses [1, 3–5]. Already in 1992 Holland et al. demonstrated that the transition to outpatient cataract extraction was not associated with adverse effects [6]. Cost savings of outpatient procedures are estimated at about 20% [3, 4]. In many cases patients who were hospitalised overnight could have been safely treated as day cases [7]. The aim of this study was to analyse the differences in the rates of outpatient cataract surgery (ROCS) of ten European countries and to determine the factors influencing them.

S. M. Mojon-Azzi
Research Institute for Labour Economics and Labour Law,
University of St. Gallen,
St. Gallen, Switzerland
e-mail: stefania.mojon@unisg.ch

D. S. Mojon (✉)
Department of Ophthalmology, Eye Institute, Kantonsspital,
CH-9007 St. Gallen, Switzerland
e-mail: daniel.mojon@kssg.ch

Materials and methods

This study is based on data from SHARE, the Survey of Health, Ageing and Retirement in Europe. Data representing the non-institutionalised population aged 50 and older and their spouses were collected in 2004 through computer-assisted personal interviews in ten participating European countries. Data collected include health, psychological, economic, and social support variables. Some questions concerned the last inpatient and the last outpatient surgery performed before the interview. The study population was driven from national, regional, or local population registers and telephone directories. It consisted of 22,777 persons (10,088 men; 12,685 women; 4 gender missing) aged between 10 and 104 years (mean: 64.2±10.5) [8, 9]. For 251 individuals (93 men and 158 women) aged 51 to 91 (mean: 73.8±9.1) cataract surgery was the last surgery performed before the SHARE interview.

Three country-specific health indicators for the year 2003 were taken from the 2005 OECD statistics: (1) the public expenditure on health as per cent of total expenditure on health, (2) the number of acute care beds per 1,000 population, and (3) the number of practicing physicians per 1,000 population [10]. These indicators were chosen as proxies for more precise data that were not available, such as the public expenditure for cataract surgery, the number of ophthalmic surgical beds, and the number of ophthalmologists performing cataract surgery. Health indicators were available for all countries except Greece where the acute care beds density per 1,000 population was missing.

Additional country-specific explanations were obtained by questioning actual or past board members of the European Society for Cataract and Refractive Surgery (opinion leaders). Each opinion leader was asked to explain the ROCS in his country including the reasons why cataract surgeons prefer inpatient to outpatient cataract surgery or vice versa. With the exception of the Greek cataract surgeon, all addressed opinion leaders answered the questions.

Statistical analysis

A logistic regression was performed to determine for which countries the log odds of outpatient to inpatient cataract surgery differed significantly from that of the reference country, Denmark. Denmark was chosen as the reference category because it was the only country in which cataract surgery was performed to 100% as an outpatient procedure. Because Denmark and Austria both had a category with 0 patients (in one case inpatients, in the other outpatients), making logistic regression inaccurate, we added one patient for each category (for each, one more outpatient and one more inpatient). With the help of logistic regression we estimated the effect of the three country-specific health indicators on the log odds of outpatient to inpatient cataract surgery. All three country-specific health indicators could be included in the regression analysis because the analysis of multicollinearity resulted in variance inflation factors (VIF) smaller than 10 (Table 2) [11].

Results

Of all analysed cataract operations, 68.5% (172 cases) were performed on an outpatient and 31.5% (79 cases) on an inpatient basis, but there are considerable differences in the proportion of outpatient cataract surgery between the analysed countries. In Denmark, the Netherlands, Sweden, or Spain, cataract surgery is almost always performed as an outpatient procedure. For Austria the sample included only inpatient surgery. Germany, Italy, France, Greece, and Switzerland had a proportion of outpatient cataract surgery ranging from 41.7% in Greece to 69% in Italy.

There are only small differences between the mean age of outpatients (mean 73.2±9.2) and inpatients (mean 75.2±8.8) and between their genders (men: 67.7% outpatient; women: 69% outpatient). The average waiting time for cataract surgery (3.3 months ±4.4) was slightly shorter for inpatients (mean 3.0±3.7) than for outpatients (mean 3.5 months ±4.6). The explanations of the country-specific ROCS given by the opinion leaders are summarised in Table 1.

Logistic regression suggested that for most of the analysed countries the logodds of out- to inpatient cataract surgery differed significantly from that of Denmark, the only country with no inpatient cataract surgery performed. This difference to the reference category Denmark was particularly high for Austria ($p<0.0001$), followed by Greece ($p<0.01$), France ($p<0.01$), Switzerland ($p<0.05$), Germany ($p<0.05$), and Italy ($p<0.05$).

Table 2 shows that the choice of either inpatient or outpatient surgery resulted in being influenced by the density of acute care beds ($p<0.0000001$), by the density of practicing physicians ($p<0.05$), and by the proportion of public to total expenditure on health ($p<0.01$). The lower the density of acute-care beds and of practicing physicians and the higher the proportion of public to total health expenditure, the more surgery was performed on an outpatient basis.

Discussion

The rate of cataract surgery performed on an outpatient basis differed consistently between the ten analysed European countries. Where all Danish cataract surgeries included in the sample were performed as day surgeries, in

Table 1 Descriptive statistics of cataract surgeries and summary of the answers of country-specific opinion leaders in the field of cataract surgery

Country/ROCS in %	n/mean age ± SD	Explanation of the country-specific ROCS and reasons for preferences of inpatient or outpatient cataract surgery
Austria 0%	20/74.5±9.8	(1) Health insurance does not pay for outpatient surgery; (2) hospitals do not get credits for day surgery; (3) however, situation has changed since 2005
Germany 64.3%	28/72.6±7.7	(1) Inpatients are patients over 70 with comorbidity; (2) less experienced surgeons do not want to take risks and prefer overnight surgery; (3) privately insured patients are mostly inpatients because of higher reimbursement by the health insurance; (4) depends if surgeon works in outpatient clinic, is connected to a hospital, or works in a hospital
Sweden 93.6%	31/75.8±8.9	(1) Economic reasons; (2) strong trend towards outpatient surgery; (3) few hospital beds; (4) inpatients are mostly patients needing general anaesthesia, live far away or are complicated cases
The Netherlands 93.1%	29/75.7±9.8	Financially more profitable for the hospital to work on an outpatient basis
Spain 81.8%	33/76.0±7.5	Outpatient surgery is "better" (simpler and less expensive)
Italy 69.0%	29/72.1±7.5	(1) Inpatients are difficult cases or live far from the hospital (>90 km qualifies to perform inpatient cataract surgery); (2) some patients prefer inpatient surgery; (3) surgeons get a slightly higher reimbursement for inpatient surgery; (4) hospitals get higher reimbursement for inpatients
France 52.2%	23/75.1±9.8	Surgeons want to examine the patients at the 1st postoperative day, and in such cases, patients prefer to stay in the hospital for 1 night as hotel expenses are not reimbursed by the insurance
Denmark 100%	22/70.6±11.6	(1) Distances in Denmark are very short; (2) no financial differences between inpatients and outpatients; (3) patients get surgery in both cases at price zero
Greece 41.7%	24/71.5±8.9	Opinion leader did not answer the questions
Switzerland 58.3%	12/71.4±9.8	Surgeons can (depending on individual deals and location) earn substantially more with in-patient surgery
Total 68.5%	251/73.8±9.1	

ROCS: rate of outpatient cataract surgery in 2004

Austria all were performed on an inpatient basis. Although specific information about the length of hospital stays after cataract surgery is missing, probably, the majority of inpatients just stayed the night after surgery, and rarely remained hospitalised for several days. A low acute-care bed and physician density and a high proportion of public to total health expenditure increased significantly the ROCS performed in a country. Opinion leaders also considered the density of acute care beds as a factor influencing the ROCS, e.g., in Sweden the high ROCS were explained by a traditionally low bed density. Another factor mentioned by the opinion leaders to explain country-specific ROCS was the distance between the surgeon/hospital and patient: in Denmark the short distances to hospitals are given as a reason for the high ROCS, in Italy a long distance allows for reimbursed inpatient cataract surgery, and in Sweden inpatient surgery is considered for far away patients. In some countries (Italy and France) opinion leaders think the ROCS are also influenced by patient preferences for ambulant or overnight surgery.

Table 2 Multivariate logistic regression analysis (AIC=231) of determinants of the logit of outpatient to inpatient cataract surgery for 251 patients in ten European countries

	Estimate ± SE	p	VIF
Physician density	−1.14±0.49	0.02	5.7
Acute bed	−0.65±0.12	9.28e-08	6.0
Public expenditure	0.06±0.02	0.006	7.9

VIF: variance inflation factor

The influence of an increase of the rate of public health expenditure can result through a higher degree of regulation towards the less expensive outpatient surgery. Most opinion leaders confirm the strong influence of financial incentives for surgeons and/or hospitals on the ROCS. In Austria, the only country with no outpatient surgery performed in our sample, the very low ROCS was explained by the fact that, until recently, the health insurance did not pay for outpatient surgery, and the hospitals did not get credits for day surgery. Meanwhile this has changed, so now hospitals get the same amount of credits for outpatient as for inpatient surgery. In the Netherlands, on the contrary, it seems to be financially more profitable for hospitals to work on an outpatient basis, which explains the high ROCS. In Switzerland financial preferences of health insurances on the one side and of cataract surgeons on the other can have a strong influence on the choice between ambulant and overnight surgery. Surgeons in Switzerland can (depending on individual deals and location) earn substantially more with inpatient surgery. In Italy inpatient surgery is preferred by surgeons as well as by hospitals as they get a higher reimbursement for it.

The Spanish opinion leader thinks outpatient surgery is better as it is simpler and less expensive. Most opinion leaders confirm that inpatient surgery is medically indicated only in complicated cases, for patients with comorbidity,

and in cases where patients need general anaesthesia. These cases seem to account for a small minority of all performed cataract surgery. The low ROCS of some countries therefore do not reflect different medical indications, but mainly the strong influence of financial incentives and regulations on the choice of surgeons.

This study has some limitations. The first is due to OECD health statistics dating from the year 2003 because 2004 statistics were not yet available. However, based on the development of the health indicators for the past years, we did not expect major changes between 2003 and 2004. The second limitation is due to the fact that the Greek density of acute care beds per 1,000 population as well as the answers of the Greek opinion leader are missing. The third limitation relates to the use of general health indicators as proxies for cataract-specific health indicators that are not available, such as the public expenditure for cataract surgery, the number of ophthalmic surgical beds, and the number of ophthalmologists performing cataract surgery.

In conclusion, we found large differences in the ROCS of the ten analysed European countries. The ROCS are negatively influenced by the acute-care bed density and by the density of practicing physicians, and positively by the public expenditure in health. Opinion leaders in the field of cataract surgery consider that also regulations and financial incentives have a strong influence on the ROCS, stressing the fact that the decision for in- or outpatient cataract surgery is primarily based on non-medical reasons.

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